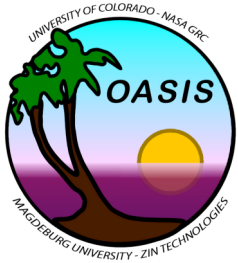




Observation and Analysis of Smectic Islands in Space (OASIS)



PI: Prof. Noel Clark, University of Colorado
European PI Prof. Ralf Stannarius
Co-Is: Prof. Joe MacLennan, Prof. Matt Glaser,
 University of Colorado,
PS: Padetha Tin, NCSE/NASA GRC
PM: Donna Bohman, NASA GRC
Engineering Team: ZIN Technologies, Inc.

Objective:

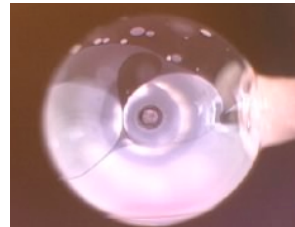
- ♦ To exploit the unique characteristics of freely suspended liquid crystals in a microgravity environment to advance the understanding of fluid state physics.

Relevance/Impact:

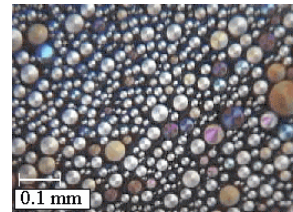
- ♦ Currently an important unsolved problem ferroelectric liquid crystal micro-displays in the space helmets is the annealing of dislocations generated when the smectic layers are formed on the transparent viewing screen of the display unit. The proposed liquid crystal bubble experiments resolve the annealing dislocation problem of smectic ferroelectric liquid crystal micro-displays, one of the key aspects of generating well aligned electro-optic devices. It will improve the contrast, resolution and response time of the liquid crystal display devices that are currently used on the Helmet Mounted and Head Up display systems.

Development Approach:

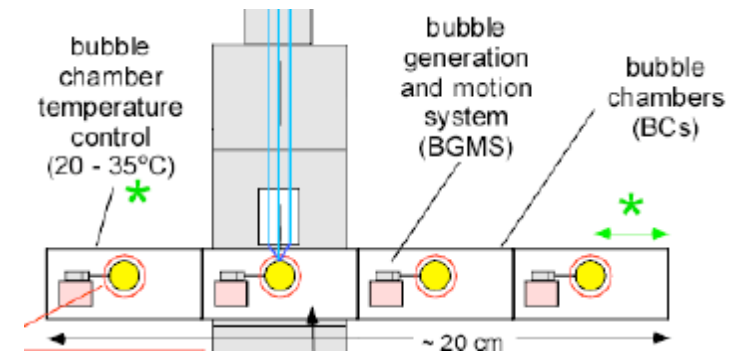
- ♦ The OASIS flight instrument originally considered for LMM is being designed to optimize use of the MSG
- ♦ The OASIS/MSG will be designed for operations through scripts and ground commanding. Crew time is required for initial installation, checking sample loading and bubble/island formation.
- ♦ The OASIS is being designed to utilize the MSG capabilities to the maximum extent possible.



Islands on 1cm bubble



Glenn Research Center



OASIS Configuration Concept

ISS Resource Requirements

Accommodation (carrier)	Fluids Integrated Rack (FIR)/LMM
Upmass (kg) (w/o packing factor)	10 Kg
Volume (m³) (w/o packing factor)	0.09
Power (kw) (peak)	1.6kw for OASIS / MSG
Crew Time (hrs) (installation/operations)	5 Hours
Autonomous Operation	2 months
Launch/Increment	ATV-2 or HTV-2 / Increment 24

Project Life Cycle Schedule

Milestones	SCR	RDR	PDR	CDR	Phase 0/II Safety	Phase III Safety	FHA	Launch	Ops	Return	Final Report
Actual/ Baseline	5/2008	7/2009	1/2010	7/2010	7/2009	10/2010 /	3/2011	6/2011 or 7/2011	2011	2012	2013
Documentation	Website: to be developed eRoom: to be developed				SRD: Draft 04/14/2008 EDMP: to be developed			Project Plan: to be developed SEMP: to be developed			